AMENDMENT

This listing of claims will replace all prior versions, and listing, of claims in the application.

1. (Currently Amended) A computer-implemented method of processing acoustic data acquired at a receiver, the method comprising the steps[[:]] of:

processing the acoustic data to obtain at least a down-going component of a parameter of the acquired acoustic data; and

using at least the down-going component of the parameter to identify the direct arrival at the receiver of acoustic energy emitted by a source.

2. (Previously Presented) A computer-implemented method as claimed in claim 1 and comprising the step of identifying, in the down-going component of the parameter, the direct arrival at the receiver of acoustic energy emitted by a source.

3. (Previously Presented) A computer-implemented method as claimed in claim 1, wherein the parameter of acoustic data is pressure.

4. (Previously Presented) A computer-implemented method as claimed in claim 3 and comprising determining the down-going component of the pressure from the pressure acquired at the receiver and from either the vertical component of the particle motion acquired at the receiver or the vertical component of the pressure gradient acquired at the receiver.

5. (Previously Presented) A computer-implemented method as claimed in claim 1, wherein the parameter of acoustic data is the vertical component of particle motion acquired at the receiver or is the vertical component of the pressure gradient acquired at the receiver.

6. (Previously Presented) A computer-implemented method as claimed in claim 5 and comprising determining the down-going component of the vertical component of particle motion from the pressure acquired at the receiver and from either the vertical component of the particle motion acquired at the receiver or the vertical component of the pressure gradient acquired at the receiver.

7. (Previously Presented) A computer-implemented method as claimed in claim 4, wherein the vertical component of particle motion is the vertical component of particle acceleration.

8. (Previously Presented) A computer-implemented method as claimed in claim 4, wherein the vertical component of particle motion is the vertical component of particle velocity.

9. (Previously Presented) A computer-implemented method as claimed in claim 3, wherein the step of determining the down-going component of the pressure comprises determining:

$$P^D = \frac{1}{2}\left(P - \frac{\rho a}{\sqrt{k_a^2 - k_x^2 - k_y^2}} v_z \right)$$

where P is the pressure acquired at the receiver, v_z is the vertical component of particle velocity acquired at the receiver, ρ is the density of water, a is the angular frequency of the acoustic energy, $k_a = a / c_a$ is the magnitude of the wavenumber for acoustic energy in the water, c_a is the velocity of acoustic energy in water, and k_x and k_y are horizonta1 wavenumbers.

10. (Previously Presented) A computer-implemented method as claimed in claim 1 and comprising processing at least the down-going component of the parameter of the acoustic data thereby to derive a further parameter of the acoustic data, and identifying in the further parameter, the direct arrival at the receiver of acoustic energy emitted by a source.

11. (Previously Presented) A computer-implemented method as claimed in claim 10 wherein the further parameter is the direct arrival wavefield.

12. (Previously Presented) A computer-implemented method as claimed in claim 1, further comprising the step of determining the path length of acoustic energy from the source to the receiver from the direct arrival of acoustic energy at the receiver.

13. (Previously Presented) A computer-implemented method as claimed in claim 12 wherein the source is spatially separated from the receiver, and wherein the path length of seismic energy

from the source to the receiver is indicative of the separation between the source and the receiver.

14. (Previously Presented) A computer-implemented method as claimed in claim 12 wherein the source is proximate to the receiver, and wherein the path length of seismic energy from the source to the receiver is indicative of the range from the source and receiver to a reflector of acoustic energy.

15. (Previously Presented) A method of seismic surveying comprising:

actuating a source of acoustic energy to emit acoustic energy; acquiring acoustic data at a receiver; and

processing the acoustic data according to a computer-implemented method as defined in any of claims 1 to 3, 5, 10, and 12.

16. (Previously Presented) A computing apparatus for processing acoustic data acquired at a receiver, the apparatus comprising:

means for processing the acoustic data to obtain at least a down-going component of a parameter of the acoustic data; and

means for identifying the direct arrival at the receiver of acoustic energy emitted by a source, using at least the down-going component of the parameter.

17. (Previously Presented) A computing apparatus as claimed in claim 16 and wherein the means for identifying the direct arrival are adapted to identify the direct arrival in the down-going component of the parameter.

18. (Previously Presented) A computing apparatus as claimed in claim 16 and comprising means for processing at least the down-going component of the parameter of the acoustic data thereby to derive a further parameter of the acoustic data; and wherein the means for identifying the direct arrival are adapted to identify the direct arrival in the further parameter.

19. (Previously Presented) A computing apparatus as claimed in claim 16, further comprising means for determining the path length of acoustic energy from the source to the receiver from the direct arrival of acoustic energy at the receiver.

20. (Previously Presented) A computing apparatus as claimed in claim 16, comprising a programmable data processor.

21. (Original) A storage medium containing a program for the data processor of an apparatus as defined in claim 20.

22. (Previously Presented) A seismic surveying apparatus comprising:

a source of acoustic energy; a receiver spatially separated from the source; and

a computing apparatus as defined in any of claims 16 to 20 for processing acoustic data acquired at the receiver.

23. (Previously Presented) A ranging apparatus comprising: a source of acoustic energy; a receiver located proximate to the source; and a computing apparatus as defined in any of claims 16 to 20 for processing acoustic data acquired at the receiver.